

What is claimed is:

1. A process for the manufacture of 1,3,3,3-tetrafluoropropene comprising :
 - a) reacting 1-chloro-3,3,3-trifluoropropene with hydrogen fluoride in a reactor in the vapor phase and in the presence of a fluorination catalyst and under
5 conditions sufficient to form an intermediate product which comprises 1-chloro-1,3,3,3-tetrafluoropropane and/or 1,1,1,3,3-pentafluoropropane; and
 - b) reacting said intermediate product with a caustic solution and under conditions sufficient to dehydrochlorinate 1-chloro-1,3,3,3-tetrafluoropropane and/or to dehydrofluorinate 1,1,1,3,3-pentafluoropropane, forming a reaction
10 product which comprises 1,3,3,3-tetrafluoropropene.
2. The process of claim 1 wherein the intermediate product comprises 1-chloro-1,3,3,3-tetrafluoropropane.
- 15 3. The process of claim 1 wherein the intermediate product comprises 1,1,1,3,3-pentafluoropropane.
4. The process of claim 1 wherein the intermediate product comprises both 1-chloro-1,3,3,3-tetrafluoropropane and 1,1,1,3,3-pentafluoropropane.
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5. The process of claim 1 which comprises reacting the trans isomer form of 1-chloro-3,3,3-trifluoropropene.
6. The process of claim 1 which comprises reacting the cis isomer form of 1-chloro-3,3,3-trifluoropropene.
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7. The process of claim 1 which comprises reacting both the trans and cis isomer forms of 1-chloro-3,3,3-trifluoropropene.

8. The process of claim 1 wherein said caustic solution comprises NaOH , KOH, Ca(OH)₂, CaO or combinations thereof.
9. The process of claim 1 wherein said dehydrochlorination of 1-chloro-1,3,3,3-tetrafluoropropane and said dehydrofluorination of 1,1,1,3,3-pentafluoropropane
5 are conducted simultaneously in the same reactor.
10. The process of claim 1 wherein step (b) is conducted by first separating 1-chloro-1,3,3,3-tetrafluoropropane and 1,1,1,3,3-pentafluoropropane, and then separately dehydrochlorinating 1-chloro-1,3,3,3-tetrafluoropropane with said
10 caustic solution and separately dehydrofluorinating 1,1,1,3,3-pentafluoropropane with said caustic solution.
11. The process of claim 1 wherein said fluorination catalyst is selected from the group consisting of transition metal halides, Group IVb metal halides, Group
15 Vb metal halides and combinations thereof on activated carbon or fluorinated alumina.
12. The process of claim 1 wherein said fluorination catalyst is selected from the group consisting of SbCl₅, SbCl₃, TaCl₅, SnCl₄, NbCl₅, TiCl₄, MoCl₅, Cr₂O₃,
20 Cr₂O₃/Al₂O₃, Cr₂O₃/AlF₃, Cr₂O₃/carbon, CoCl₂/Cr₂O₃/Al₂O₃, NiCl₂/Cr₂O₃/Al₂O₃, CoCl₂/AlF₃, NiCl₂/AlF₃ and combinations thereof.
13. The process of claim 1 wherein said fluorination catalyst is selected from the group consisting of Cr₂O₃, Cr₂O₃/AlF₃, CoCl₂/AlF₃, NiCl₂/AlF₃ and
25 combinations thereof.
14. The process of claim 1 wherein said fluorination catalyst comprises SbCl₃ or SbCl₅ supported on activated carbon.

15. The process of claim 1 wherein the reaction of step (a) is conducted at a temperature of from about 50°C to about 200°C.
16. The process of claim 1 wherein the reaction of step (a) is conducted at a
5 pressure of from about 15 psia and 215 psia.
17. The process of claim 1 wherein the mole ratio of hydrogen fluoride to 1-chloro-3,3,3-trifluoropropene is from about 1:1 to about 50:1.
- 10 18. The process of claim 1 further comprising feeding chlorine to the reactor to keep the catalyst active.
19. The process of claim 1 wherein the reaction of step (b) is conducted at a temperature of from about 20°C to about 100°C.
- 15 20. The process of claim 1 wherein the reaction of step (b) is conducted at atmospheric pressure.
21. The process of claim 1 wherein the caustic strength of said caustic solution
20 is from about 2 wt % to about 100 wt %.
22. A process for the manufacture of 1,3,3,3-tetrafluoropropene comprising :
a) reacting 1-chloro-3,3,3-trifluoropropene with hydrogen fluoride in a reactor in the vapor phase and in the presence of a fluorination catalyst and under
25 conditions sufficient to form an intermediate product which comprises 1-chloro-1,3,3,3-tetrafluoropropane and/or 1,1,1,3,3-pentafluoropropane; and
b) thermally decomposing said intermediate product under conditions sufficient to dehydrochlorinate 1-chloro-1,3,3,3-tetrafluoropropane and/or to dehydrofluorinate 1,1,1,3,3-pentafluoropropane, forming 1,3,3,3-
30 tetrafluoropropene.

23. The process of claim 22 wherein step (b) is conducted at a temperature of from about 30°C to about 400°C.
- 5 24. The process of claim 22 wherein step (b) is conducted at a temperature of from about 50°C to about 350°C.
25. The process of claim 22 wherein step (b) is conducted at a temperature of from about 75°C to about 300°C.
- 10 26. The process of claim 22 wherein step (b) is conducted at atmospheric pressure.
27. The process of claim 22 wherein step (b) is conducted in the presence of a catalyst.
- 15 28. The process of claim 22 wherein step (b) is conducted in the presence of a catalyst selected from the group consisting of supported or bulk transition metal halides.
- 20 29. The process of claim 27 wherein the catalyst is selected from the group consisting of iron halides, nickel halides, cobalt halides and combinations thereof.
- 25 30. The process of claim 27 wherein said catalyst comprises supported or bulk FeCl₃, NiCl₂ or CoCl₂.
31. The process of claim 22 wherein said dehydrochlorination of 1-chloro-1,3,3,3-tetrafluoropropane and said dehydrofluorination of 1,1,1,3,3-pentafluoropropane are conducted simultaneously in the same reactor.
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32. The process of claim 22 wherein step (b) is conducted by first separating 1-chloro-1,3,3,3-tetrafluoropropane and 1,1,1,3,3-pentafluoropropane, and then separately thermally dehydrochlorinating 1-chloro-1,3,3,3-tetrafluoropropane
5 and separately thermally dehydrofluorinating 1,1,1,3,3-pentafluoropropane.

33. The process of claim 22 wherein said fluorination catalyst is selected from the group consisting of transition metal halides, Group IVb metal halides, Group Vb metal halides and combinations thereof on activated carbon or fluorinated
10 alumina.

34. The process of claim 22 wherein said fluorination catalyst comprises SbCl_3 or SbCl_5 supported on activated carbon.

15 35. The process of claim 22 wherein the mole ratio of hydrogen fluoride to 1-chloro-3,3,3-trifluoropropene is from about 1:1 to about 50:1.